juries and operative wounds in the presence of lues are not necessarily and in fact are usually not complicated by the syphilis and run a not at all unfavorable course. Given proper asepsis, all surgical diseases heal readily even in the presence of a recent syphilis. Trauma is of far greater importance in the so-called parasyphilitic diseases. There are many instances recorded where tabes and paresis ran either latent or mild courses, a fall or other injury causing a marked progression.

TUMORS.

The following cases from the records of the Industrial Accident Commission are worthy of mention:

Case No. 15.—Widow, age 35. January 10, 1914, while at work, struck right breast against the corner of a box. Immediately complained of pain. Tumor was said to develop at site of injury and on August 18, 1914, operation was performed and growth removed, the diagnosis at this time being cystic adenoma. Later examination showed the condition had been one of chronic cystic mastitis and that the accident probably called the attention of the patient to the tumor,—that the tumor was a coincidence and not due to the trauma.

Case No. 16.—December 3, 1914, tank exploded and head of the tank hit the patient, causing bursitis of knee, ankle sprain and a penetrating wound in the middle part of thigh. X-ray showed no bone injury. February, 1915, an osteosarcoma of the femur, the result of injury, was diagnosed; 606 was advised with the proviso that if there were no results in ten days, operation and removal of specimen was to take place. Patient refused syphilitic treatment and operation. Finally, March 20, 1915, removal of specimen showed no malignant growth, i. e., no osteosarcoma of the femur, but a large cystic periosteal tumor which was removed. The patient now well.

To decide that a tumor is the result of a trauma (1) a tumor should develop at the site of the injury; (2) the tumor should develop on the remains of an injury, for example, a fistula or an unhealed wound; (3) the intensity of the trauma should be sufficiently great; (4) a continuity of symptoms from the time of the trauma to the occurrence of the tumor should be, if possible, demonstrated; (5) the time between the injury and the occurrence of the growth should not be over two years, though there are exceptions to this rule. (6) On the other hand, the time between the occurrence of the injury and the tumor should not be less than a certain minimum, e. g., a sarcoma three weeks; a cancer six weeks. If one sees a wound edge undergoing sarcomatous degeneration under one's eyes inside of ten days, the condition is not to be denied. If the growth is rapid, it is probable that it existed prior to the injury. (7) The indirect occurrence of a tumor must be rejected, e. g., one cannot admit that a rundown condition predisposes to its occurrence. (8) An aggravation of a tumor may occur after a trauma, e. g., a nevus or a small angioma, or a breast fibroid may grow very rapidly after an injury, though if the tumor be a cancer this cannot be admitted as it would be certain to do so without the accident.

FRACTURE RECORDS; A NATIONAL EFFORT TOWARD STANDARDIZATION.*

By THOMAS W. HUNTINGTON, M. D., F. A. C. S., San Francisco.

Recent legislation, both national and state, providing for industrial insurance and employer's liability, has a distinct and important bearing upon fracture treatment. No other class of injuries presents so many phases which subject the person in charge and the result attained to so sharp criticism. As a consequence, an abrupt and imperative demand for clearly defined and fully recognized standards has been imposed upon all who are, directly or indirectly, responsible for fracture treatment and end results.

It may be truthfully stated that our knowledge of end results, as related to fractures, is an unknown quantity. This admission, though humiliating, is, nevertheless, beyond question, and in no other department of surgery does this condition prevail. Individual statistics, based almost entirely upon fracture status at the termination of treatment—that is, at the time of the patient's discharge —are far from complete or satisfactory. Very rarely have cases been traced beyond this period.

"With few exceptions, surgeons have neglected to perfect their records upon the following essential points, viz: exact description of initial lesion; period of hospital residence; time interval between injury and resumption of work; degree of permanent deformity and loss of function."

As a rule, favorite methods of treatment have found justification when union has taken place and the patient has been discharged; later and most essential details are rarely available. I am of the opinion that the real merit of various methods and policies must await final adjudication, until a very large number of fractures have been observed for a period of from one to three years. This will involve such an outlay of time and effort as will, rarely, be incurred by individuals, and such investigation can only be efficiently carried out by social service organizations which command the time of men specially qualified for critical analysis.

Furthermore, we are confronted by this vital consideration, that in each individual fracture, its mechanism and primary status are widely variable factors as influencing end results, or determining the value of a particular method of treatment. The designation "fracture of the humerus," "forearm," "femur" or "leg" in the tabulation of a series of fractures is vague and indeterminate, in the absence of full details as to the peculiar features of each fracture.

Similar comment applies to the classification "open," "closed," "comminuted" and "joint fracture," and deductions from indiscriminate classification are inherently misleading and of little scientific value.

"All surgeons," says John B. Walker, "must admit the necessity of collecting data for future guidance in giving the best prognosis and treatment. But it is possible to make this material of value *only* by carefully classifying and correctly collating

* Read before the San Francisco County Medical Society, September 7th, 1915.

large numbers of cases, so that we can find the normal average duration of disability which is our best guide for treatment in a given type of case. In our previous attempts to do this, we have become more and more dissatisfied with present statistics, for our judgment tells us that the majority of statistics are incorrect."

Since the foregoing was written, Dr. Harold Brunn, of San Francisco, in a personal communication, makes the following confirmatory comment: "I have attempted to follow your scheme in the analysis in a series of 63 fractures, occurring in the City and County Hospital of San Francisco, and I find this to be almost impossible without giving an erroneous impression of our statistics, for the following reasons:

"First—Histories are frequently incomplete, and essential data are wanting.

"Second—The class of cases we have dealt with are, frequently, old and arthritic, or suffering from a complication of diseases.

"Third—Our patients usually are without means or refuge, and their hospital residence is measured by their ability to perform manual labor, after dismissal."

Dr. Chas. G. Levison, of San Francisco, in a personal communication says: "After going over my fracture histories, I am unable, satisfactorily, to furnish data as to hospital residence, period of convalescence, and degree of impaired function. This is usual in hospitals which have not developed the social service system."

It is an aphorism that nearly every fracture embodies a potential loss of function and deformity. Consequently, it is fundamental that analyses of end results, as related to types of fracture or special methods of treatment must reckon not only with the bone or bones involved, but with the peculiar mechanism of small groups of each type. This involves a study of the following collateral data:

(1) The personal equation of the patient; age, social and physical condition.

(2) The bone lesion, whether single or multiple, relation to joint structures, direction of fracture lines, and co-existing comminutions.

(3) Trauma of soft parts, skin, muscles, blood vessels, and nerve trunks.

(4) The special method used, and in operative cases, the fixation material employed.

Revival of interest in this department of surgery, in recent years, has led to a keen appreciation of the tremendous importance of the subject. Surgeons realize that conventional methods of whatever type do not satisfy the exactions of the patient or the courts. Each step in the development of the subject, has suggested new and interesting problems in the associated sciences, biology, mechanics, economics, and sociology. Each of these interests has challenged consideration, and each has stimulated human endeavor.

Mankind has learned to think in similar terms, and has arrived at a finer sense of proportion. Precision has become the genius of performance, and values are expressed not in vague generalities, but in equations. Indifferent and arbitrary standards are no longer accepted as a yard stick, nor do they serve as a refuge. "Bony union," once the surgeon's shibboleth, in the presence of obvious defects, such as discomfort, lowered efficiency or loss of function, is no longer an achievement. Briefly, clinical and sociological results must be closely correlated." †

In 1914, the American Surgical Association appointed a special "Committee on Fracture Treatment," of which W. L. Estes, of Bethlehem, Pa., was the chairman.

This committee has been continued from year to year and is now earnestly endeavoring to perfect the work entrusted to it. This committee, at the last meeting of the American Surgical Association, recommended a plan whereby exact knowledge of the subject may be obtained from surgeons and hospitals.

From the foregoing statement, it is obvious that only meagre data were, hitherto, available. In furtherance of this undertaking, the committee has formulated—

First: A "Schedule of Fractures" which will be recorded as a classification standard, throughout this country, as follows:

AMERICAN SURGICAL ASSOCIATION.
SCHEDULE OF FRACTURES.

Humerus—
- a. Anatomical neck.
- b. Separated upper ephiphysis (with or without fracture).
- c. Fracture of tuberosity.
- d. Fracture of surgical neck.
- e. Fracture of shaft.
- f. Supracondylar fracture.
- g. Internal condyle; external condyle; capitellum.

Radius—
- a. Head and neck.
- b. Shaft.
- c. Lower end (not Colles's).

Ulna—
- a. Olecranon.
- b. Shaft.
- c. Lower end.

Radius and Ulna—
- a. Shafts of both bones.
- b. Colles's.

Femur—
- a. Neck, through the
- b. Neck, base of the
- c. Trochanteric.
- d. Upper third.
- e. Middle third.
- f. Lower third.
- g. Supracondylar.
- h. Involving knee joint.

Tibia—
- a. Involving knee joint.
- b. Shaft.
- c. Internal malleolus.

Fibula—
- a. Shaft.

Tibia and Fibula—
- a. Shafts.
- b. Pott's.

† "Review of Fracture Literature." Thos. W. Huntington, M. D. Annals of Surgery, September, 1915.

Secondly: An "Inquiry Form for Fractures" which will serve as a record sheet in dealing with all fractures of long bones, as follows:

General Results:	GOOD	MODERATE	BAD
Anatomical			
Functional			

AMERICAN SURGICAL ASSOCIATION

INQUIRY FORM FOR FRACTURES

1. Bone..... 2. Site—Neck....Upper....Middle....Lower 3d....Condyle....Involving joint....
3. Name..... 4. Sex—M....F.... 5. Age..... 6. Occupation.....
7. Time fracture occurred—Date.....Hour..... 8. Hospital entered.....Date.....Hour.....
9. First treatment date.....Hour..... 10. Cause of fracture.....
11. Kind of fracture—Oblique....Transverse....Spiral....Impacted....Comminuted....Simple....Compound.....
12. Was there serious injury to soft parts—Skin—Yes...No.... Muscles—Yes...No... Vessels—Yes....No.... Nerves—Yes...No.....
13. Reduction: How many hours elapsed after accident before reduction?.....
14. Was anatomical reposition of fragments obtained? Yes.....No.....
15. Anesthetics used: Yes....No.....Ether.....Gas.....
16. Fixation: Closed Method.
    Position, Hyperflexion..full supination..abduction
    Splints .....
    Plaster of paris.....
    Traction—Bucks..Jones..Hodgen...Bardenheuer...
    Steinman .....
    Amount of weight used.....
17. Open Method.
    Was nonoperative treatment tried first.....
    How long after injury was operation performed...
    Was open reduction alone performed.....
    What form of internal fixation used—Steel Plates.....Wire.....
    Nails.....Screws.....Bone transplants.....
    Was it later necessary to remove fixation materials.....
18. Shortening at first examination.....cm. When all apparatus removed.....cm. Date.....
    When discharged from hospital.....cm. Date..... At last observation.....cm. Date.....
19. X-Ray—Yes...No...First finding on the...day before;...on the...day after reduction. Fragments Displaced—Slightly....Markedly.....
    Fair apposition—Yes...No... Anatomical—Yes...No... Overriding.....cm. Rotation—Yes...No.....
    At last finding on the...day Overriding...cm. Apposition Fair—Yes...No... Anatomical—Yes...No...
20. How long confined in bed-..... How long in Hospital?.....
21. How long did patient use crutches?..... Cane?.....
22. Results: Final examination made....weeks....months after injury. Union bony....fibrous....Non-union....
23. Disability—Partial....Complete....Estimated by deformity....Shortening....Angulation....Swelling of soft Parts....Pain....Nerve involvement....Interference with joint function....Endurance.....
24. Mortality—Age of patient.....Main cause of death.....
25. Duration of absence from work.....weeks.....months.....
26. Is patient fully able to take his former job?.....
27. Present wage earning capacity compared with former.....
28. Compensation under insurance, legislative act or legal process obtained—Yes.....No.....
    Expected—Yes.....No.....

At the close of Dr. Estes's recent report, he makes the following statement: "The first step in the betterment of practice is the study of results achieved by present day methods. An adequate study is impossible without adequate records.

"The committee strongly urges the American Surgical Association to set its seal of approval upon the standard form of record submitted by the committee, and further to petition the American Medical Association to do the same. The committee also urges each member of this Association faithfully to keep these records in his practice and to see that they are kept in the hospitals to which he is attached.

"The Committee further recommends that a copy of the approved form be sent to all corporations within the United States of sufficient importance to have their own relief organizations or medical service or both; to all accident insurance companies to be embodied and incorporated in the papers given to the insured, with the requirement that they be filled at the time of an accident involving fracture; to all hospital boards with the request that these records be made a part of the routine records of fracture patients, pointing out that thus not only are the hospital and its surgeons protected in case of litigation, but that most valuable material is being collected to serve for attaining better results in the treatment of fractures."

As a member of this Committee, there has been entrusted, to me, the task of interesting surgeons, hospitals, corporations, accident insurance companies, and employers' liability commissions, throughout the Pacific Coast, in this subject and earnestly soliciting their co-operation.

The subject will be presented to the California State Medical Society, at its next meeting, and to the various County Societies of California; also, to the Medical Societies of all the Pacific Coast States, and as far as possible, to the County Societies of said states, with an earnest appeal to those bodies to further the efforts of this committee.

The same procedure will be adopted throughout the country by other members of the Committee. In this way, we may hope that, in from two to five years, we shall have an accumulation of evidence which is complete and accurate; from whence deductions which are of tremendous importance may be drawn.

Finally, I recommend that the "Schedule of Fractures" and "Inquiry Form for Fractures" to be designated as authorized by the American Surgical Association, be adopted and made official by this society.

It is expected that these documents will be printed in large numbers by some authorized person or persons, and thereby become available for all those who are interested in the subject.

Discussion.

Dr. Harry M. Sherman, San Francisco: This is a matter of course which must interest me because I too have been treating fractures as long as I have been treating anything, and I am somewhat

in the dark regarding the ultimate results of not a few of the cases.

We cannot very well keep in touch with our patients after they have left the hospital, and a man very rarely follows up his private patients unless something keeps him in touch with the family and individuals. I see old fractures which have been treated by other people as other people, I suppose, see old fractures that have been treated when new by me. I think the chief value in this effort is that it will stimulate accurate history taking, but accurate history taking is something that cannot come immediately. The man who tries to write an accurate history, and goes back to it two or three years later, will find how incomplete it is and disappointing. This will stimulate an effort to be accurate in the taking of records.

There is one record which can be taken without particular accuracy on the part of the surgeon, and that is the X-ray record; and that filed away in the hospital or place for radiograms, is something that never tells a falsehood—so far as it goes. But the interpretation of to-day may not be that of two years ago. Then again, there is the fact that radiograms on glass are fragile and if they are broken the record may be lost; but the record of the lesion, of what was done in its repair, and the immediate result set forth in the history, might be more lasting. However, a fracture, accurately diagnosed first by the radiogram, and then inspected through the open incision, but which results unhappily for the patient in the end, would of course be judged by that result.

It is the follow-up system of the hospitals, when that has become universal and general, which will take off the shoulders of the surgeon (who is always more interested in a new patient than in the one who has left him) the task of learning the ultimate result and classifying it. I think the follow-up system is one of the great steps which is before us, one which has to be taken. We have been trying it in San Francisco at St. Luke's Hospital for a little over a year. The attitude of the men toward it was, of course, a personal one: some were not interested in it; some objected to it; others were interested in a half-hearted way; and a few of us were interested to the extent of trying it out. It was carried out the first year at the expense of the staff—enough to keep a clerk, supply pens, ink, paper and other materials necessary for the filing away of records; postage stamps for sending out letters, and methods of tabulating these when they came in. This second year it is being taken care of by the Hospital. This two years' trial is going to be rather a short one, but already I have learned from it. People that I have thought Simon pure successes are not such; some I was rather chagrined with are perfectly satisfied with what they have. For instance, Saturday afternoon a former patient met me at the Exposition and showed me his wrist (Colles fracture). He has a hand that suits him perfectly, and it is a bad deformity resulting from a Colles fracture. That man, when he gets his letter, will say his wrist has a lump on one side, but he will say also that it is a perfectly good wrist. Technically it can be called an anatomic failure but a functional success.

We have to depend, therefore, upon an unstable system, an erratic system, which will not be purely scientific so long as it depends upon the varying opinion of different and indifferent individuals to estimate the result. The only way of careful analysis would be to have every one of these individuals followed and examined by a surgeon, and that would be a tremendous undertaking, one too great for a surgeon alone to carry through.

The test of this will come, as Dr. Huntington understands, after we have tried it. I shall be very glad to use it in all my own work and I shall urge that it be used at St. Luke's, and we will try it out as well as we can. We will agree, in the first place, not to make any changes, but we may make certain additions, and all that will be submitted to the committee, so that in the end that committee will have, not a broader viewpoint, but a broader range of vision from which to draw their deductions.

That this great step has come in connection with fractures is interesting. If it had not been for the radiogram, we would be treating fractures now as we have been treating them for the past thousand years.

THE USE OF CARBON DIOXID IN DERMATOLOGY.*

By E. D. LOVEJOY, A. B., M. D., Los Angeles.

Refrigeration in the treatment of skin conditions was first tried by Dr. White, of Boston, in 1899, the medium employed by him being liquid air. This has a temperature of —418 F., is a bluish white, clear liquid and instantly freezes all tissue with which it is brought in contact. It undoubtedly was a valuable agent, but not being a commercial product, was very expensive and could not be kept for any length of time. Later, ethyl chloride and liquid carbonic acid spray were tried, but subsequently given up.

Not until Dr. Pusey, of Chicago, introduced carbonic acid in the solid form, or carbon dioxid, as it is now called, did we have a satisfactory agent, one which was easily handled, inexpensive, and at the same time could be kept on hand.

Carbon dioxid is a by-product obtained in the combustion of coke. It is condensed into a liquid form by pumping into cylinders, under pressure varying from 850 to 1000 pounds to the square inch. These cylinders are easily obtained at a slight expense and with ordinary care one tank will serve for anywhere from 50 to 100 treatments, depending on the waste.

The effects of CO_2 on the skin are entirely controlled by the amount of pressure exerted and by the duration of the application. We may produce anything from a most superficial freezing, to one of one-eighth of an inch or more in depth. Much less pressure is, of course, to be exerted over bony prominences than over soft tissue.

Pathologically, there occurs a thrombosis of the vessels of the frozen area, also direct injury to the tissues by the freezing and thawing, as well as a marked exudation of fluid and cells, resulting in an absorption of the inflammatory products.

Clinically, we observe a depressed, snowy white area, solid to the touch, exactly corresponding in shape, with the carbon dioxid snow. In a minute or so, this disappears, a red edematous, slightly elevated area taking the place which may or may not go on to blister formation. Gradually the fluid is absorbed, a crust forms which in about a week or ten days, comes off, leaving a smooth, soft, whiteish area as a result. Certainly the cosmetic result cannot be improved upon.

As regards the technic of the individual case, it is much harder to lay down any definite rules. An ordinary application lasts from 20 to 60 seconds, while the pressure exerted cannot well be

* Read before Santa Monica Branch of L. A. County Medical Society, July 19, 1915.